Space Weather Forecast

Issued on Friday, 13 January 2023 at 01:27 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

Space Weather Forecast Headline: Moderate flares (R1-R2 radio blackouts) expected. Chance of Strong flares (R3 radio blackouts).

Solar Activity: Solar activity has been Moderate over the past 24 hours, with two Moderate flares. There are six numbered sunspot regions on the visible disc, one of which has a high magnetically complexity, while three others are moderate complexity, and the rest are small and simple. There are a further two unnumbered regions on the disc, one of which is a new region rotating on from the far side onto the southeast limb, and potentially may fully emerge to reveal a large and complex region. Several Coronal Mass Ejections (CME's) have occurred through the period, but currently none are thought to be Earth directed.

Solar Wind / Geomagnetic Activity: Solar winds continued at slightly elevated levels, generally between 400-440km/s, under the residual weak coronal hole influence. The solar wind peaked at 464 km/s at 12/1349 UTC. The strength of the magnetic field was predominantly at weak levels throughout, while the important north-south component varied weakly between positive and negative values. Geomagnetic activity was Quiet to Unsettled.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at mostly background levels with no solar radiation storms occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity expected to remain at Moderate levels with occasional strong flares, and a chance of X-class flares, due to a number of complex active regions on the visible disc. Also, a new potentially significant region is currently rotating onto the disc on the southeast limb.

Solar Wind / Geomagnetic Activity: No Earth-directed CMEs are currently expected, although a CME which left the Sun on 09 January could give a glancing blow at Earth early today, but this is a low probability and low confidence. Solar wind speeds are currently around 400km/s due to weak residual coronal hole influence, and are likely to remain at background to slightly elevated levels. No further coronal holes are expected to connect with Earth during the forecast period. Geomagnetic activity is expected to be Quiet to Unsettled, although there is a slight chance of Active intervals early today due to the possible a glancing impact of the CME.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is likely to remain at background to slightly elevated levels. However, the high energy protons have started day 1 (13th) with an increase from background levels, but still remains well below the S1/Minor Storm threshold. As there are various complex regions in the western hemisphere so there is an increasing risk of the S1/Minor Storm being reached, should any significant flares occur.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	1	1	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	70	70	70	70
Very Active	R3 to R5 X	No	20	20	20	20

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	40	40	30	30
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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